



**University of  
Zurich**<sup>UZH</sup>

**Zurich Open Repository and  
Archive**

University of Zurich  
University Library  
Strickhofstrasse 39  
CH-8057 Zurich  
[www.zora.uzh.ch](http://www.zora.uzh.ch)

---

Year: 1983

---

## **Intolerance of ambiguity as a factor in the appreciation of humour**

Ruch, Willibald ; Hehl, Franz-Josef

**Abstract:** The relevance of the concept 'Intolerance of Ambiguity' within the field of humour has been investigated. It is predicted that intolerant people prefer jokes whose incongruity is solvable whilst rejecting the non-solvable nonsense jokes. Subjects were 134 male students who were asked to complete questionnaires and to rate 120 jokes according to the criteria 'Funniness' and 'Rejection'. Both hypotheses were confirmed by comparison of extreme groups as well as in correlations using the whole sample. Additionally, the predictive value of related variables such as Rigidity, Dogmatism and Conservatism was assessed.

DOI: [https://doi.org/10.1016/0191-8869\(83\)90073-9](https://doi.org/10.1016/0191-8869(83)90073-9)

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-77525>

Journal Article

Accepted Version

Originally published at:

Ruch, Willibald; Hehl, Franz-Josef (1983). Intolerance of ambiguity as a factor in the appreciation of humour. *Personality and Individual Differences*, 4(5):443-449.

DOI: [https://doi.org/10.1016/0191-8869\(83\)90073-9](https://doi.org/10.1016/0191-8869(83)90073-9)

This manuscript was published as:

Ruch, W. & Hehl, F.-J. (1983). Intolerance of ambiguity as a factor in the appreciation of humour. *Personality and Individual Differences*, 4, 443-449.

# INTOLERANCE OF AMBIGUITY AS A FACTOR IN THE APPRECIATION OF HUMOUR

WILLIBALD RUCH AND FRANZ-JOSEF HEHL

Psychologisches Institut der Universität Düsseldorf, Lehrstuhl für Psychologie II  
(Experimentelle Biologische Psychologie), Universitätsstraße 1, D-4000 Düsseldorf. F.R.G.

(Received 25 January 1983)

**Summary** - The relevance of the concept 'Intolerance of Ambiguity' within the field of humour has been investigated. It is predicted that intolerant people prefer jokes whose incongruity is solvable whilst rejecting the non-solvable nonsense jokes. Subjects were 134 male students who were asked to complete questionnaires and to rate 120 jokes according to the criteria 'Funniness' and 'Rejection'. Both hypotheses were confirmed by comparison of extreme groups as well as in correlations using the whole sample. Additionally, the predictive value of related variables such as Rigidity, Dogmatism and Conservatism was assessed.

## INTRODUCTION

In the literature of general psychology within the field of humour the importance of one variable becomes more and more obvious: nearly all stimuli we consider (potentially) funny possess an element of incongruity. Keith-Spiegel (1972) gives a summary of the early theories of humour and demonstrates that the origins of this point of view can be found in the eighteenth century already, although name and exact definition changed frequently.

In recent years (Jones, 1970; Shultz, 1970, 1972; Suls, 1972) an additional aspect was taken into consideration, that of the importance of the resolution of incongruity. Incongruity is defined as

"... a conflict between what is expected and what actually occurs in the joke." (Shultz, 1976)

Resolution is a

"... second, more subtle aspect of jokes which renders incongruity meaningful or appropriate by resolving or explaining it." (Shultz, 1976, pp. 12-13)

Berlyne's (1960, 1972) theory of collative motivation serves as a theoretical framework in the field of humour (Godkewitsch, 1972, 1976). Certain arousal fluctuations are experienced as pleasant. Among Berlyne's arousal-inducing collative variables are Complexity, Novelty, Ambiguity, Incongruity, Redundance, Uncertainty etc. Suls (1972) reasons that a certain kind of arousal change - the boost-jag-wave - is also compatible with his two-stage model: the boost occurs in the incongruity phase, the jag in the resolution phase.

In opposition to Shultz and Suls, Rothbart (1973) argues that incongruity alone is sufficient to experience humour; an increase of arousal is experienced as pleasant if it occurs in a safe context. This kind of arousal fluctuation should be typical for nonsense jokes, Shultz (1976) defines nonsense as "pure or unsolvable incongruity". Rothbart and Pien (1977) distinguish possible and impossible incongruities and - dependent on that - complete and incomplete

resolutions. Eysenck (1942) argues that incongruities are often connected by a 'deeper' sense, this can only be the case for jokes whose incongruities are solvable.

An important factor in experiencing humour is, according to Shultz (1972), being able to tolerate incongruent units, i.e. they are not prematurely solved or rejected. Without 'phantasy assimilation' the recipient cannot reach the point, and thus consider the joke funny.

All general psychological approaches can be criticized for not taking into account the complexity of the topic. Factor-analytical pioneer studies by Eysenck (1942, 1943), Andrews (1943) and Cattell and Luborsky (1947) showed that 'sense of humour' cannot be regarded as unidimensional. They extracted between three and six factors which according to Leventhal and Safer (1977) partly show similarity. On the whole one cannot draw many conclusions from these studies because in addition to methodological weaknesses (cf. Wilson, 1979) there is little comparability concerning sample selection, methodology, mode of presentation, selection of jokes and scaling techniques. Unfortunately, there have been no attempts to develop models or theories from the results determined by factor analysis. Therefore it is not surprising that today, the personality approach is to relate personality traits to a priori joke categories, whose homogeneity have not been investigated empirically. Leventhal and Safer (1977) criticize these methods and suggest theoretical framework in which personality research is more guided by theory. Ruch (1980) has tried to integrate the different approaches with the help of the three-mode factor analysis. He showed that the three dimensions of sense of humour can be described by other general psychological models: Factor 1 'projective incongruity-resolution jokes' and 2 'sex jokes' have the typical two-stage structure, whereas Factor 3 consists of pure unsolvable incongruities. The first two joke types can be described as 'resolution-centered' and the third one as 'incongruity-centered'. One could speculate that Factor 1 should be associated with a boost-jag arousal fluctuation, as are the sex jokes although the sex jokes are also characterized by a steeper initial gradient. The arousal-boost hypothesis should prove correct for the nonsense factor.

The relation of the three joke factors to achievement, personality and attitude variables was investigated (Ruch, 1981). It could be shown (Ruch, 1983) that Conservatism can be seen as a variable that lies 'behind' the first factor: the better a joke 'measures' Conservatism the higher is its loading on this factor. Studies intending to explain the variance of the other types are in progress.

## LINKS WITH PERSONALITY AND DEDUCTION OF THE HYPOTHESES

In this study the hypotheses deducible from the general psychological models discussed above will be tested. Frenkel-Brunswik (1948, 1949) introduced Intolerance of Ambiguity as a general personality variable (see also Budner, 1962; Bochner, 1965; MacDonald, 1970). This concept classifies people according to the intensity of their experience of ambiguous (i.e. new, unsolvable and complex) stimuli as a source of threat. Avoiding ambiguity could allow predictions about jokes with different structure: incongruity-resolution jokes and sex jokes contain incongruent (ambiguous) elements which are solvable whereas nonsense jokes remain unsolvable. Berlyne argues that the arousal decrease evoked by the resolution of incongruity is experienced as pleasant. One can deduce from this that ambiguity reduction has a higher value of reinforcement for (ambiguity-) intolerant people than for (ambiguity-) tolerant people. Therefore one can predict that the two resolution-related joke types (incongruity-resolution jokes, sex jokes) will be rated as funnier by intolerant persons, whereas tolerant persons will find these joke types less funny. As nonsense jokes do not allow ambiguity reduction, they should be rejected more strongly by the group of into intolerant persons. These two hypotheses will be tested in the present experiment. It is not possible to predict a preference of tolerant persons for nonsense jokes from the given concept because these people

are only characterized by tolerance of ambiguity, not by the search for and the positive assessment of ambiguity.

## METHOD

The 'sense of humour' test used consists of 120 jokes which were selected to cover the three joke types. The test contains 46 of the 48 jokes used in the first explorative study (Ruch, 1980). The jokes were to be rated on a 7-point scale according to two criteria: how funny one finds them and how much one rejects them. The questionnaire by Nigniewitzky (1955) translated by Brengelmann and Brengelmann (1960a) was used as a measure of Intolerance of Ambiguity. Furthermore, the following related variables were measured: Dogmatism (Brengelmann and Brengelmann, 1960a), Rigidity (Brengelmann and Brengelmann, 1960b) and the German adaptation of the Wilson and Patterson (1969) Conservatism scale by Schneider and Minkmar (1973) was given.

Subjects were 143 students of the University of Düsseldorf who took part in a psychophysiological experiment. Ss were obtained by pamphlet advertisement and were paid for their services. Students of psychology were excluded. The 120 jokes were distributed between six test booklets with 20 jokes each. Every S was tested individually on 3 different days. A S completed two booklets when registering, two 1 week later during a battery of questionnaires and the last two again after a week immediately following an experiment.

## ANALYSIS

The mean of all Ss on the Intolerance of Ambiguity Questionnaire is 7.6 with an SD of 4.0. The theoretical range of values is 0-28 points, the observed range is 0-20 points. The values of skewness and kurtosis are not significant, therefore one can assume a normal distribution. Extreme-scoring Ss (0-4 and 13-20 points) were allocated to the groups of tolerant and intolerant persons; this resulted in 16 persons in the group of tolerant and 17 persons in the group of intolerant people.

For further analysis the Ss' factor scores of the incongruity-resolution type, the sex type factor and the nonsense joke factor were used. In the given sample the three-factor structure could be found (Ruch, 1983). For this reason factor scores were calculated for the Funniness as well as for the Rejection ratings. Two analyses of variance are performed with a 2 x 3 design. Intolerance of Ambiguity is the first independent variable and the three joke types are the second. The Funniness factor scores are the first dependent variable, the Rejection factor scores the second. Normal distribution and variances were tested and it could be seen that only the scores of the intolerant Ss are positively skewed for the rejection of the nonsense factor ( $z = 2.94$ ,  $P < 1\%$ ). This problem will be considered when discussing the results.

The results of the analysis of variance using the scale 'Funniness' are shown in Table 1.

It turns out that the main effect is significant as well as the interaction. The means of both groups are given in Table 2.

It was predicted that the group of intolerant Ss would rate the two solvable joke types as funnier than the group of tolerant persons. This hypothesis will be tested with the Duncan test. The differences for the incongruity-resolution jokes ( $t = 2.99$ ,  $P < 1\%$ ,  $d.f. = 31$ ) as well as for the sex jokes ( $t = 3.74$ ,  $P < 1\%$ ) are significant in the expected direction. Therefore hypothesis 1 can be regarded as confirmed.

The results of the analysis of variance using the criterion 'Rejection' are shown below (see Table 3).

Table 1. Table of the analysis of variance (Funniness)

Source of variance	SS	d.f.	MS	F-value
Intolerance of Ambiguity	15.31	1	15.31	14.66##S. S.445##
Variance within	32.39	31	1.04	
Joke types	1.29	2	0.65	0.86 NS
Interaction	8.66	2	4.33	5.77†
Error	46.48	62	0.75	

NS, non-significant; \*5% significance level; †1% significance level; ##Symbol S.445## 0.1% significance level.

Table 2. Group means of the tolerant and intolerant Ss relating to the ratings of the three joke categories according to the criterion 'Funniness'

	Incongruity resolution jokes	Sex jokes	Nonsense jokes
Tolerant	-0.75	-0.61	-0.11
Intolerant	0.31	0.72	-0.15

Table 3. Table of the analysis of variance (Rejection)

Source of variance	SS	d.f.	MS	F-value
Intolerance of Ambiguity	0.00	1	0.00	0.00 NS
Variance within	30.54	31	0.99	
Joke types	2.12	2	1.06	1.10 NS
Interaction	5.63	2	2.81	2.93 $P < 0.06$
Error	59.58	62	0.96	

Table 4. Group means of the tolerant and intolerant Ss relating to the ratings of the three joke categories according to the criterion 'Rejection'

	Incongruity - resolution jokes	Nonsense jokes	Sex jokes
Tolerant	-0.03	0.34	-0.35
Intolerant	-0.36	-0.01	0.32

Hypothesis 2 predicts that intolerant Ss show higher Rejection scores for nonsense jokes than the tolerant group. The interaction group joke type just fails to reach significance ( $F = 2.93$ ,  $d.f. = 2$  resp.  $62$ ,  $P < 0.06$ ). The means of both groups are shown in Table 4 high scores indicating stronger rejection.

The results are in the expected direction: intolerant Ss show stronger rejection of nonsense jokes than tolerant people. In this category the Rejection scores of the intolerant Ss are higher than the Rejection scores for sex and incongruity-resolution jokes, the group of the tolerant Ss on the other hand shows the least rejection of nonsense jokes. Hypothesis 2 can be regarded as conditionally confirmed.

## INTOLERANCE OF AMBIGUITY, RIGIDITY, DOGMATISM, CONSERVATISM AND HUMOUR

In the following passage the meaning of Intolerance of Ambiguity as a predictor of 'sense of humour' is to be investigated in comparison with variables with similar validity. It could be shown for the given and other samples (Ruch, 1983) that Conservatism can primarily be used as a predictor for the first joke factor. Wilson's dynamic theory of Conservatism (1973) regards Conservatism as generalized fear of uncertainty: the typical conservative person avoids stimuli which are uncertain in the sense of information theory (i.e. new, complex, incongruent, ambiguous etc.). This widely laid out definition of the model makes the characteristic 'Intolerance of Ambiguity' appear as a partial aspect of Wilson's theory. On the other hand especially this aspect of tolerance of incongruity or ambiguity vs non-tolerance seems to be relevant for the appreciation of jokes.

The role of personality variables has been discussed in research of attitudes for a long time. Eysenck (1954) saw the personality trait Extraversion (E) behind his Toughminded vs Tenderminded factor in early studies, later (Eysenck and Wilson, 1978) he stressed the importance of the variable 'Psychoticism' (P) in this realm. Rokeach (1960) on the other hand thinks that people have different open or closed systems of attitudes and named this dimension 'Dogmatism'.

Rigidity presents a variable which is considered by many scientists as closely related to the preceding concepts.

The intercorrelations of these variables and the correlations with the factor scores of the three joke types, using both criteria, are calculated for the whole sample ( $N = 134$ ) and given in Table 5.

Table 5. Intercorrelations of the personality dimensions Intolerance of Ambiguity, Conservatism, Dogmatism, Rigidity and their relations to the 'Funniness (columns 4-6) and 'Rejection (columns 7-9) factor scores of the three joke dimensions

	Conservatism	Dogmatism	Rigidity	Incongruity-resolution jokes	Nonsense jokes	Sex jokes	Incongruity-resolution jokes	Nonsense jokes	Sex jokes
Intolerance of Ambiguity	0.28##	0.50##	0.40##	0.19*	0.34:	-0.03	-0.06	-0.08	0.19*
Conservatism		0.16	0.26#	0.46:	0.28#	-0.27#	-0.20'	-0.01	0.19*
Dogmatism			0.35#	0.10	0.14	0.04	-0.02	0.03	0.01
Rigidity				0.16	0.17*	-0.08	0.05	0.10	0.26#

\*5% significance level; #1% significance level; #0.1% significance level.

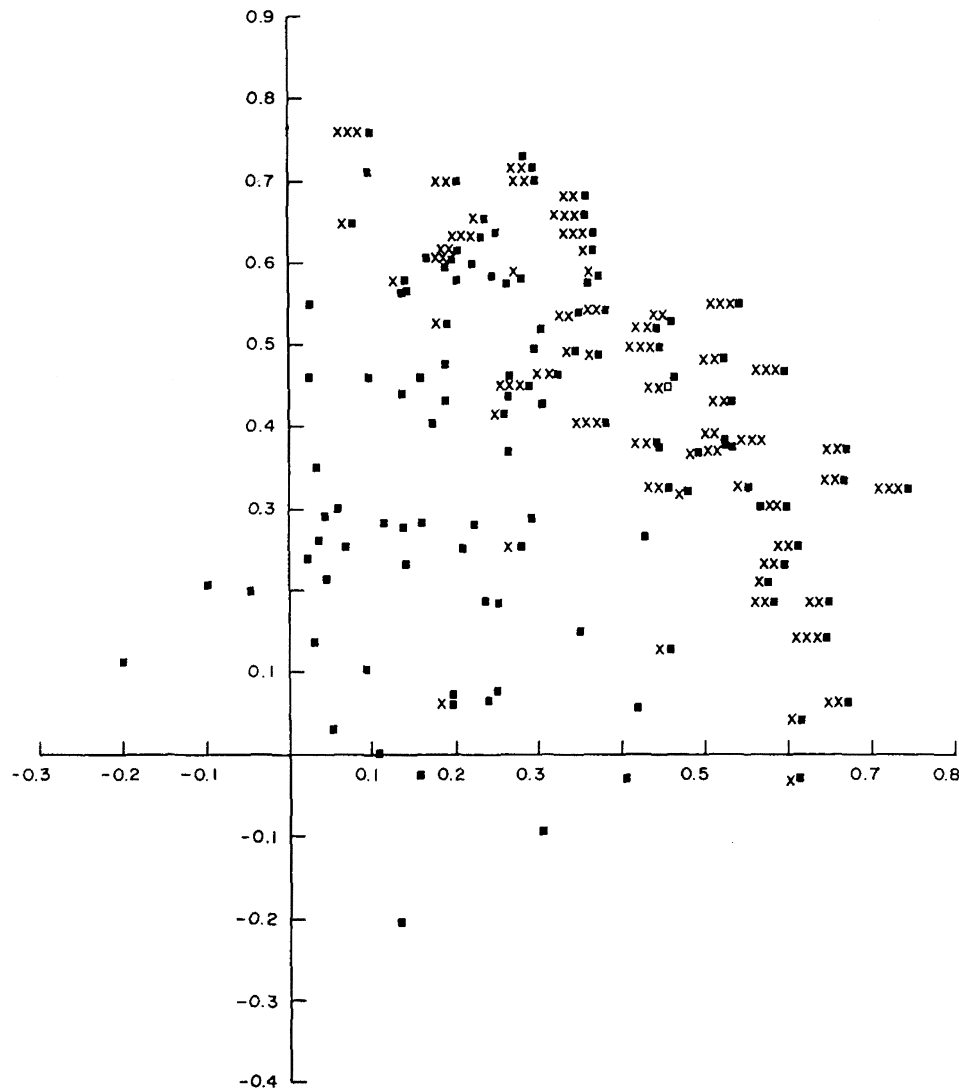


Fig. 1. Varimax loadings of the 120 jokes (ordinate, incongruity-resolution jokes; abscissa, sex jokes). Stars indicate the significance level of the correlations of the jokes with the Intolerance of Ambiguity Questionnaire ( $\times$  5%;  $\times \times$  1%;  $\times \times \times$  0.1%).

Although the predictors tend to be very closely related to each other, it turns out that mainly Intolerance of Ambiguity and Conservatism show substantial correlations with the joke types. Dogmatism does not seem to have any (linear) predictor relevance in this field, Rigidity only correlates with considering sex jokes funny ( $r = 0.17$ ,  $d.f. = 132$ ,  $P < 5\%$ ) and rejection of nonsense jokes ( $r = 0.26$ ,  $P < 1\%$ ). Intolerance of Ambiguity correlates with the appreciation of incongruity resolution jokes ( $r = .19$ ,  $P < 0.05$ ), with rejection of nonsense jokes ( $r = 0.19$ ,  $P < 0.05$ ) and above all with the appreciation of sex jokes ( $r = 0.34$ ,  $P < 0.001$ ). Conservatism can better explain the effects predicted by Intolerance of Ambiguity, with the exception of sex jokes.

We can gain more information about the relevance of the Intolerance of Ambiguity concept if we look at the correlations of the questionnaire with ratings of single jokes. It turns out that for 57 of 120 jokes the Funniness rating correlates with the questionnaire scores at least at the 5% level, for 27 jokes the correlation is still significant at the 1% level and for 13 jokes at the 0.1% level. Because of the large number of significance tests the 5, 1 and 0.1% levels cannot be regarded as real significance limits without alpha-adjustment, rather they are descriptive cut-off points. As expected, the correlating jokes are distributed unequally over the three factors: only one joke of the nonsense factor just reaches the 5% cut-off point the remaining 56 jokes are distributed over the incongruity-resolution factor, the sex factor and



above all over mixed types of both. If one looks at the loadings of significantly correlating jokes in the first and second factors, it turns out that with decreasing loading on the incongruity-resolution joke factor the loading on the sex factor changes as follows: with increasing loading on the sex-joke factor the loading on the incongruity-resolution factor decreases (see Fig. 1).

If the coordinate system is rotated by 45°, one would find a new factor which separates exactly the significantly correlating jokes from the non-correlating jokes, i.e. those jokes whose appreciation is related to Intolerance of Ambiguity now have high loadings on this new factor whereas those jokes whose appreciation is not related to Intolerance of Ambiguity show only small or zero loadings on this factor. By a criterion rotation (Eysenck, 1950) the new factor can be rotated closely to the criterion vector (correlation jokes-Intolerance of Ambiguity) or made congruent with it. As the plausibility of the factor system used so far is already proved, criterion rotation is only mentioned as a possibility. It is interesting that those sex jokes which load on the nonsense factor as well, do not correlate with Intolerance of Ambiguity, i.e. sex jokes can only be predicted by this concept if they have the discussed two-stage-structure, if they are solvable. The question whether sexuality as contents in addition to the structure of the joke is related to the concept can hardly be answered, but it turns out that high-loading sex jokes nearly always have loadings on the first factor which go beyond the correlation with Intolerance of Ambiguity.

## DISCUSSION

The aim of the presented study is to connect approaches in general psychology and personality in the field of 'humour'. Cross-cultural studies (e.g. Castell and Goldstein, 1977) have shown that incongruity is a necessary ingredient of nearly all jokes - even in Eastern cultures (e.g. China) In the contemporary literature it is often discussed whether incongruity alone is able to provoke humour, or whether resolution of incongruity is necessary. It was shown earlier that the competing models are valid for different types of jokes. The present work was supposed to examine whether there are people who prefer the resolution-related types of joke and people who prefer the incongruity-related joke types. The concept 'Intolerance of Ambiguity' was expected to serve as a predictor. Resolution of incongruity or ambiguity should be more reinforcing for intolerant people than for a group of tolerant persons. According to the hypothesis it turned out that intolerant people rated the two resolution-centered joke types (incongruity-resolution jokes, sex jokes) as funnier, tolerant people on the other hand found these jokes less funny. In the comparison of extreme groups the second hypothesis could only be confirmed as a trend: intolerant people reject nonsense jokes more strongly. The correlation was significant in the expected direction when taking in consideration all subjects.

Additionally, it is possible to deduce from the 'Intolerance of Ambiguity' concept that intolerant persons should rate nonsense jokes as less funny than, for example, sex or incongruity-resolution jokes. But it is not possible to predict that tolerant people prefer nonsense jokes although this was also found. The concept is unipolar, i.e. it differentiates well between more or less intolerant persons, but on the tolerant side it is relatively insensitive. People gather here who show little fear or anger when facing uncertain ambiguous stimuli. But it is possible that there is a countertype to the intolerant person, namely such people who seek uncertain, ambiguous stimulus configurations. In analogy to Zuckerman's (1979) theory one could label these people 'ambiguity-seekers'. One would expect these persons to prefer a kind of humour which is mainly characterized by ambiguity, incongruity and less by resolution. They should rate the absurd nonsense jokes as funnier and reject the little stimulating resolution-related jokes. An indication that the subjects of the tolerant group may be more differentiated is given by the fact that they show the largest variance in ratings of

nonsense jokes. The predicted correlations between the questionnaires and the factor scores—using all subjects—are significant, however, the highest correlation with every single joke does not exceed 0.4. If one takes into account that the internal consistency of this test (Cronbach's  $\alpha$ ) is only 0.45 in the given sample, the results look much more promising. The combination of the correlations of the three joke types with the questionnaire leads to a multiple correlation of 0.39. When relating this value to the 'reliable' variance of the questionnaire, it turns out that the three joke types together explain 58% of the true-score variance.

It is not intended to convey the impression that the content of the particular joke is irrelevant or unimportant for the appreciation of jokes. On the contrary, it is intended to stress that the kind of presentation and working up of these contents additionally play an important role. It seems likely that the individual 'sense of humour' depends on the way an individual deals with ambiguous uncertain stimuli.

## REFERENCES

- Andrews T. G. (1943) A factorial analysis of responses to the comic as a study of personality. J. gen. Psychol. **28**, 209-224.
- Berlyne D. E. (1960) Conflict, Arousal and Curiosity. McGraw-Hill, New York.
- Berlyne D. E. (1972) Humor and its kin. In The Psychology of Humor (Edited by Goldstein J. H. and McGhee P. E.). Academic Press, New York.
- Bochner S. (1965) Defining intolerance of ambiguity. Psychol. Rec. **15**, 393-400.
- Bregelmann J. C. and Bregelmann L. (1960a) Deutsche Validierung von Fragebogen dogmatischer und intoleranter Haltungen. Z. exp. Angew. Psychol. **7**, 451-471.
- Bregelmann J. C. and Bregelmann L. (1960b) Deutsche Validierung von Fragebogen der Extraversion, neurotischen Tendenz und Rigidität. Z. exp. angew. Psychol. **7**, 291-331.
- Budner S (1962) Intolerance of ambiguity as a personality variable. J. Person. **30**, 29-50.
- Cattell P. I. and Goldstein J. H. (1977) Social occasions for joking: a cross-cultural study. In It's a Funny Thing, Humour (Edited by Chapman A. J. and Foot H. C.). Pergamon Press, Frankfurt/Main, F.R.G.
- Cattell R. B. and Luborsky L. B. (1947) Personality factors in response to humor. J. abnorm. soc. Psychol. **42**, 402-421.
- Eysenck H. J. (1942) The appreciation of humour: an experimental and theoretical study. Br. J. Psychol. **32**, 295-309.
- Eysenck H. J. (1943) An experimental analysis of five tests of appreciation of humor. Educ. psychol. Measur. **3**, 191-214.
- Eysenck H. J. (1950) Criterion analysis: an application of the hypothetico-deductive method to factor analysis. Psychol. Rev. **57**, 38-53.
- Eysenck H. J. (1954) The Psychology of Politics. Routledge, London.
- Eysenck H. J. and Wilson G. D (1978) The Psychological Basis of Ideology. Univ. Maryland Press, College Park, Md.
- Frenkel-Brunswik E. (1948) Tolerance towards ambiguity as a personality variable. Am. Psychol. **3**, 268.
- Frenkel-Brunswik E. (1949) Intolerance of ambiguity as an emotional and perceptual personality variable. J. Person. **18**, 108-143.
- Godkewitsch M. (1972) The relationship between arousal potential and funniness of jokes. In The Psychology of Humour (Edited by Goldstein J. H. and McGhee P. E.). Academic Press, New York.
- Godkewitsch M. (1976) Physiological and verbal indices of arousal in rated humour. In Humour and Laughter: Theory Research and Applications (Edited by Chapman A. J. and Foot H. C.). Wiley, London.
- Jones J. (1970) Cognitive factors in the appreciation of humor: a theoretical and experimental analysis. Unpublished Doctoral Dissertation. Yale University. New Haven, Conn.
- Keith-Spiegel P. (1972) Early conceptions of humor: varieties and issues. In The Psychology of Humor (Edited by Goldstein J. H. and McGhee P. E.). Academic Press, New York.
- Leventhal H. and Safer M. A. (1977) Individual differences, personality and humour appreciation: Introduction to Symposium. In It's a Funny Thing, Humour (Edited by Chapman A. J. and Foot H. C.). pp. 335-350. Pergamon Press, Frankfurt/Main, F.R.G.
- MacDonald A. P. (1970) Revised scale of ambiguity tolerance: reliability and validity. Psychol. Rep. **26**, 291-798.

- Nigniewitzky R. D (1955) A statistical study of rigidity as a personality variable. Unpublished M.A. Thesis. University of London.
- Rokeach M. (1960) The Open and Closed Mind. Basic Books, New York.
- Rothbart M. K. (1973) Laughter in young children. Psychol. Bull. **80** 247-256.
- Rothbart M. K. and Pien D (1977) Elephants and marshmallows: a theoretical synthesis of incongruity-resolution and arousal theories of humor. In It's a Funny Thing, Humour (Edited by Chapman A. J. and Foot H. C.). Pergamon Press, Frankfurt/Main, F.R.G.
- Ruch W. (1980) Gemeinsame Strukturen in Witzbeurteilung und Persönlichkeit. Versuch einer empirischen Integration des Gegenstandsbereiches Witzbeurteilung in die differentielle Psychologie mittels dreimodaler Faktorenanalyse. Un-published Doctoral Dissertation, Universität Graz, Austria.
- Ruch W. (1981) Witzbeurteilung und Persönlichkeit - Eine trimodale Analyse. Z. diff. diagn. Psychol. **2**, 253-273.
- Ruch W. (1983) Konservatismus und Witzbeurteilung: Konvergenz gegenstandsbereichsinterner und übergreifender Variabilität? Z. diff. diagn. Psychol. In press.
- Schneider J. and Minkmar H. (1973) Deutsche Neukonstruktion einer Konservatismusskala. Diagnostica **18**, 37-48.
- Shultz T. R. (1970) Cognitive factors in children's appreciation of cartoons: incongruity and its resolution. Unpublished Doctoral Dissertation, Yale University, New Haven. Conn.
- Shultz T. R. (1972) The role of incongruity and resolution in children appreciation of cartoon humor. J. exp. Child Psychol., **13**, 456-477.
- Shultz T. R. (1976) A cognitive-developmental analysis of humour. In Humour and Laughter: Theory, Research and Applications (Edited by Chapman A.J. and Foot H. C.). Wiley, London.
- Suls J. M. (1972) A two-stage model for the appreciation of jokes and cartoons: an information processing analysis. In The Psychology of Humor (Edited by Goldstein J. H. and McGhee P. E). Academic Press. New York.
- Wilson Ch.P. (1979) Jokes: form, content use and function. European Monographs in Social Psychology. Vol.16 (Series Editor: Tajfel H.). Academic Press, London.
- Wilson G. D (1973) The Psychology of Conservatism. Academic Press. London.
- Wilson G. D and Patterson J. R. (1969) Conservatism as a predictor of humour preferences. J. consult. clin. Psychol. **33**, 271-274.
- Zuckerman M. (1979) Sensation Seeking: Beyond the Optimal Level of Arousal. Wiley, New York.